

PAGE 1 of 1

**Refer to 1-A01-PPG-001 for Processing Instructions.**  
**Print or Type All Information (Except Signatures).**

1. Date **3/16/95**

25. DMR No. 95-DMR-ERM-0026

Existing Document Number/Revision  
RFP/ERM-94-00019 (Appendix D only)

3. New Document Number or Document Number if it is to be changed with this Revision	N/A
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4. Originator's Name/Phone/Pager/Location  
Deborah Lake/8773/080

5. Document Title	EG&G Rocky Flats Plant Integrated Operable Units Health & Safety Plan
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6. Document Type ☐ Procedure

☒ Other H&S Plan

7. Document Modification Type (Check only one)

☐ New ☐ Revision ☐ Intent Change ☒ Nonintent Change ☐ Editorial Correction ☐ Cancellation

8. Item	9. Page	10. Step	11. Proposed Modifications
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1	2		Replace Modified Table 3-1, Summary of Activities	ADMIN RECORD
2	4		Replace Table 5-2, Location and Hazard Summary By Tank	
3	8	5.4.6	In second paragraph, delete second sentence.	
4	13	5.4.8	In third paragraph, delete second sentence.	
5		Appen. A	Replace all of Appendix A (following the cover sheet), the listing of Personal Protective Equip.	

# ADMIN RECORD

12. Justification (Reason for Modification, EJO #, TP #, etc.)

Additional tanks (T-8, T-9, T-24, and T-32) were added to the field work as a result of dispute resolution between the Rocky Flats Field Office and the regulatory agencies. This required modifying the Industrial Area Health and Safety Plan to reflect these additions.

DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
CLASSIFICATION OFFICE

If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concurrency prints, and signs in Block 14, and dates in Block 15.

13. Organization	14. Print, Sign (if applicable)	15. Date (if applicable)
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SME	Craig Cowdery	3/16/95
Proj. Mgr.	Bruce D. Peterman	3/20/95
QA	R. Stephen Luker	3/17/95

16. Originator's Supervisor (print/sign/date)  
Bruce D. Peterman

## No Training Required

Assigned SME/Phone/Pager/Location  
Craig Cowdery/6955/5466/080

18. Cost Center	3113
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19. Charge Number  
989846

20. Requested Completion Date	3/24/95
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21. Effective Date  
3/21/95

22. Accelerated Review? Yes ☐ No ☒

23. ORC Review

24. Responsible Manager (print, sign, date)  
Bruce D. Peterman

REVIEWED FOR CLASSIFICATION / UCNi

BY

DATE \_\_\_\_\_

A-0009-000312

**MODIFIED TABLE 3-1**  
**Summary of Activities**  
**OU9 Original Process Waste Lines**

TANK NO.	TANK INSPECTION	HPGe/NaI SURVEY	RESIDUE OR WIPE (1)	VAULT WATER(2)	GROUND-WATER (2)	SURFACE SOIL	BOREHOLE/ SOIL SAMPLES
T-1		X			X		X
T-2, T-3	YES (T-3)	X	X(T-2) X(T-3)	X(T-2)	X	X	X
T-7		X			X		X
T-8	YES	X	X		X		X
T-9	YES	X	X		X		X
T-10	YES	X	X		X		X
T-11, T-30	YES	X	X		X	X	X
T-14, T-16	YES	X	X(T-14) X(T-16)		X		X
T-15, T-17		See T-14, T-16.			See T-14, T-16.	See T-14, T-16.	
T-21, T-22	YES	X	X(T-21) X(T-22)	X	X		X
T-24 & 32	NO	X			X	X	X
T-27	NO	See T-21, T-22.				X	
T-29	YES	X	X	X	X	X	X
T-40	YES	X	X	X	X		X

**Notes:**

- (1) If no residue is present, a wipe sample will be collected. Wipe samples will be analyzed only for qualitative radiological analysis.  
(2) Sample collected only if water is encountered.

HPGe = High Purity Germanium  
IHSS = Individual Hazardous Substance Site  
NA = Not applicable  
NaI = Sodium Iodide, conducted only if HPGe data indicate anomalies  
TBD = to be determined in the field based on HPGe results

TABLE 5-2  
LOCATION AND HAZARD SUMMARY BY TANK

Tank No.	Location	Volume	Contaminants	Confined Space Entry	Radiological Hazards	Other Related Hazards and Comments
T-1	South side of Bldg. 122. Tank has been removed	800 gallon underground stainless-steel tank	Trace radionuclides, bleach, soaps, H <sub>2</sub> O <sub>2</sub> , and some organics	No	No	Known release area. Overhead utilities (steam and natural gas); underground utilities are sewer and raw water. Area is next to door from Bldg. 122, ground is level covered with asphalt and concrete. Possible high pedestrian traffic area.
T-2	Beneath and south of Bldg. 441. Tank is in IHSS 122.	3,000 gallon underground concrete tank. Three concrete vaults are also associated with T-2.	Nitric acid (HNO <sub>3</sub> ), hydrofluoric acid (HF) sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ), hydrochloric acid (HCl), acetic acid (C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> ), perchloric acid, ammonium hydroxide (NH <sub>4</sub> OH), NaOH, acetone, alcohols, cyclohexane, toluene, xylene, triisotomine, ether, Pu, Am, U, Cm, Be, ammonium, thiocyanate, ethylene glycol, and PCBs	No	Yes, in soils and tank. Pu, Am, U, Cm.	Overhead utilities include steam, natural gas, and electrical. Underground utilities include raw water and process waste. Access for drill rig is limited. Vaults are currently locked and tagged out. Currently, approximately 100 gallons of water are in each vault. Ground surface is level and covered with gravel. Possible high pedestrian traffic area.
T-3 RFP-123	South of Bldg. 441. Tank is in IHSS 122	Aboveground 3,200 gallon steel tank and a 3,000 gallon underground concrete tank.	Ammonia was stored in aboveground steel tank. The underground concrete tank held HNO <sub>3</sub> , HF, H <sub>2</sub> SO <sub>4</sub> , HCl, C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> , perchloric acid (HClO <sub>4</sub> ), HClO <sub>4</sub> , NH <sub>4</sub> OH, NaOH, acetone, alcohols, cyclohexane, toluene, xylene, triisotomine, ether, Pu, Am, U, Cr, Be, ammonium, thiocyanate, ethylene glycol, and PCBs.	No	Yes, in soils and tank. Pu, Am, U, Cm.	Overhead utilities include steam, natural gas, and electrical. Underground utilities include raw water and process waste. Access for drill rig is limited. Will need to break piping on South side of steel tank to sample for residue. Vaults are currently locked and tagged out. Ground surface is level and covered with gravel. Possible high pedestrian traffic area.

**TABLE 5-2  
LOCATION AND HAZARD SUMMARY BY TANK**

Tank No.	Location	Volume	Contaminants	Confined Space Entry	Radiological Hazards	Other Related Hazards and Comments
T-7 RFP T-522 T-523	Inside Bldg. 528 tank vault southeast of Bldg. 559. Tanks are in IHSS 159.	Two-2,000 gallon steel tanks	HNO <sub>3</sub> , HF, H <sub>2</sub> SO <sub>4</sub> , HCl, chromic acid NH <sub>4</sub> OH, NaOH, KOH, acetone, carbon tetrachloride, chloroform, 1,1,1-TCA (methyl chloroform), TCE, freon, Pu, Am, U Cu, Cr, PCBs, pesticides, and herbicides.	Yes, if tank is sampled	Yes, in soils and tank. Pu, Am, U.	Overhead utilities to the east of Bldg. 528 include steam and natural gas. Underground utilities include process waste, raw water, domestic water, and communication cable. The east side of building is a steep grade. Drill rig access may be difficult on east side. Area around Bldg. 528 is high pedestrian and vehicle traffic. Bldg. 528 is full anti-c's requirement. Groundsurface is pavement and gravel.
T-8	Inside Bldg. 728 (Bldg. 771 process waste pit) tanks are in IHSS 126.	Two 25,000 gallon concrete underground tanks	HNO <sub>3</sub> , HCl, H <sub>2</sub> SO <sub>4</sub> , H <sub>3</sub> PO <sub>4</sub> , HF, C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> , NH <sub>4</sub> OH, NaOH, KOH, MgOH, CaOH, cyclohexane, chloroform, xylene, PCE, TCA, TCE Pu, Am, U, tritium, Pb, Hg, Ni, Cr, Cr+6, Ti, Ce, Ta, Cu No. 2 and No. 6 fuel oil, lubricating oil, slight possibility of PCBs. Sodium sulfide, potassium sulfide, sodium sulfate, sodium acetate, ammonium thiocyanate	Yes, if entry into tank	Yes, in soils and tank. Pu, Am, U (more U-235 than U-238), slight tritium	Overhead utilities consist primarily of electrical, underground utilities, include process waste, domestic water and sewer. Ground surface is level and drill access is accessible. Area is high in pedestrian traffic
T-9	Inside Bldg. 730 north of Bldg. 776.	Two 22,500 gallon concrete underground tanks 25 ft. by 15 ft. by 10 ft	Carbon tetrachloride, TCA, TCE, toluene, Pu, U, Am, tritium, Cd, Cr, and lubricating oils.	Yes, if entry into tank; yes, sampling tank residues	Yes, in soil and tank. Pu, Am, U, tritium	Overhead utilities include natural gas, steam, electrical, acid, and plenum. Underground utilities include process waste, raw water, domestic water and sewer. Ground surface is level but drill rig access is limited. Full anti-c's required to enter the building. Area is high in vehicle and pedestrian traffic.

**TABLE 5-2  
LOCATION AND HAZARD SUMMARY BY TANK**

<b>Tank No.</b>	<b>Location</b>	<b>Volume</b>	<b>Contaminants</b>	<b>Confined Space Entry</b>	<b>Radiological Hazards</b>	<b>Other Related Hazards and Comments</b>
T-10	Inside Bldg. 730 north of Bldg. 776. Tanks are in IHSS 132.	Two 4,500 gallon concrete underground tanks	CCl <sub>4</sub> , TCA, TCE, toluene, Pu, Am, U, Pu, U, tritium, Cd, Cr, and lubricating oils	Yes, sampling tank residues	Yes, in soils and tank. Pu, Am, U, tritium	Overhead utilities include natural gas, steam, electrical, acid and plenum. Underground utilities include process waste raw water, domestic water and sewer. Ground surface is level but drill rig access is limited. Full anti-c's required to enter the building. Area is high vehicle and pedestrian traffic zone.
T-11/T-30	Inside Bldg. 731 tank vault east of Bldg. 707.	Two 2,000 gallon concrete tanks and one 23,111 gallon vault	CCl <sub>4</sub> , TCA, TCE, chloroethane, freon, Pu, Am, U, Pb, Be, Ta, U, calcium, fluoride, lithium chloride, machine oils, lubricating oils, lathe coolant, and ethylene glycol	NA	NA	
T-14 RFP T-68	East of Bldg. 774 in IHSS 124	30,000 gallon concrete underground tank	HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HF, NaOH, KOH, small amounts of various solvents, Pu, Am, U, Fe, Cr, Hg, Ni, Ta, chlorides, oils, and grease. Tank has been flushed with water.	Yes, if entry into tank	Yes, in soils and tank. Pu, Am, U.	Tank manways are sealed locked and tagged out. One way to sample tank is from inside Bldg. 774 in an RCA. Sample point may be from the tank drain line. No overhead utilities on east side of building. Soil borings will be on level ground. Underground utilities include process waste. Area is high pedestrian and vehicle traffic.
T-16 RFP T-66 and T-67	East of Bldg. 774 in IHSS 124 and 125	Two 14,000 gallon concrete underground tanks	HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HF, NaOH, KOH, small amounts of various solvents, Pu, Am, U, Fe, Cr, Hg, Ni, Ta, chlorides, oils, and grease. Tanks has been flushed with water.	Yes, if entry into tank	Yes, in soils and tank. Pu, Am, U.	Tank manways are sealed locked and tagged out. One way to sample tank is from inside Bldg. 774 in an RCA. Sample point may be from the tank drain line. No overhead utilities on east side of building. Soil borings will be on level ground. Underground utilities include process waste. Area is high pedestrian and vehicle traffic.

TABLE 5-2  
LOCATION AND HAZARD SUMMARY BY TANK

Tank No.	Location	Volume	Contaminants	Confined Space Entry	Radiological Hazards	Other Related Hazards and Comments
T-21	Inside Bldg. 828 tank vault west of Bldg. 886 in IHSS 164.2.	135 gallon concrete floor sump	Soaps, cleaning fluids, U-235, nitrates, and Pu	Yes, sampling sump residue	Yes, in soils and tank vault. Pu and U-235. Potentially fissile	No overhead utilities in immediate area. Drill rig access is sufficient, must clear security zone. Underground utilities include process waste, sewer and foundation drains. Vault structure is one unit. Access to vault is by manway or lifting off concrete slabs that cover the vault. Water is present in the vault in the spring from infiltration of groundwater and precipitation. Ground surface is level covered with gravel. Possible vehicle and pedestrian traffic in area.
T-22 RFP T-440 and T-449	Inside Bldg. 828 tank vault west of Bldg. 886 in IHSS 164.2.	2,450 gallon SST and 1 100 gallon SST	One of the 450 gallon tanks was used to store waste from rooms 101 and 103 in Bldg. 886. This waste consisted of U and Pu. The other 450 gallon tank stored fissile uranium used for experiments after mbdng. The 100 gallon tank stored plutonium used for experiments after mbdng.	Yes, sampling tank residue	Yes, in soils and tank Pu and U-235. Potentially fissile	No overhead utilities in immediate area. Drill rig access is sufficient, must clear security zone. Underground utilities include process waste, sewer and foundation drains. Vault structure is one unit. Access to vault is by manway or lifting off concrete slabs that cover the vault. Water is present in the vault in the spring from infiltration of groundwater and precipitation. Ground surface is level covered with gravel. Possible vehicle and pedestrian traffic in area.
T-24 & 32	Tanks are located in Bldg. 887.	Tank T-24 consists of 7 - 2,700 gallon, above-ground steel tanks situated within T-32, a concrete vault. Tank T-32 is a 131,160-gallon underground sump	HNO <sub>3</sub> , H <sub>3</sub> PO <sub>4</sub> , HF, H <sub>2</sub> SO <sub>4</sub> , NaOH, KOH, CCl <sub>4</sub> , TCA, TCE, freon U, PU Am (no tritium); also possibly Np-237 Hg, Cr, Ni, Mo, Mn, Fe possible lubricating oil, grinding oil. <u>Very</u> slight chance of PCBs.	NA	Yes in tank and possibly in surround soils U, Pu, Am (no tritium); also slight possible Np-237	Overhead Electrical Utilities, underground utilities include sanitary sewer and foundation drain Drill rig access level and accessible, no pedestrian traffic.

**TABLE 5-2  
LOCATION AND HAZARD SUMMARY BY TANK**

Tank No.	Location	Volume	Contaminants	Confined Space Entry	Radiological Hazards	Other Related Hazards and Comments
T-27	North of Bldg. 828 on concrete slab. Tank has been removed.	500 gallon portable liquid dumpster.	Waste from rooms 101 and 103 in Bldg. 886. Possible U and Pu.	NA	Yes, in soils Pu and U-235	No overhead utilities in immediate area. Drill rig access is OK, must clear security zone. Underground utilities include process waste, sewer and foundation drains.
T-29 RFP T-207	South of Bldg. 774 and east of Bldg. 703	200,000 gallon above ground steel tank	HNO <sub>3</sub> , HF, H <sub>2</sub> SO <sub>4</sub> , HCl, C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> , H <sub>3</sub> PO <sub>4</sub> , H <sub>2</sub> CrO <sub>4</sub> , HClO <sub>4</sub> , cyanic, NH <sub>4</sub> OH, NaOH, KOH, CaOH, MgOH, acetone, alcohols, cyclohexane, toluene, xylenes, trisooctomine, ether, TCA, TCE, PCE, freon, CCl <sub>4</sub> , chloroform, chloroethane, tri-n-octyl, phosphine oxide, Pu, Am, U, Cm, Be, Ag, Au, Cr, Ta, Ni, Cd, Pt, Pb, Ti, Zn, Cu, Sn, W, Fe, Hg, Li, Ca, Ce, Mn, Mg, Mo, ammonium thiocyanate, ethylene glycol, PCBs, fluoride, lubricating oil, No. 2 and No. 6 fuel, oil and kerosene.	Possibly when sampling tank residue	Yes, in soils and tank Pu, Am, U, Cm	No overhead utilities. Underground utilities are process waste. A beehive exists around the northern side of T-29. Access to T-29 is through the top of the tank or a manway on the west side of the tank. Manway is three feet from ground surface. Tank is next to cooling tower, noise level is moderate. Area is high vehicle and pedestrian traffic zone.
T-40	West of Bldg. 889	2 400 gallon concrete underground tanks	H <sub>2</sub> SO <sub>4</sub> , paint solvents, U-238, Pb, Be, detergents, soap and grease.	Yes, sampling tank residue	Yes, U-238 in tank and possible surround soil	No overhead utilities. Underground utilities include process waste. Door to tanks is welded shut. Some documentation exists on decontamination of tanks when abandoned. Possible pedestrian traffic area.

**Notes:**

Am = americium

Be = beryllium

Ca = calcium

CCl<sub>4</sub> = carbon tetrachloride

Cd = cadmium

Cr = chromium

Cu = copper

Fe = iron

HF = hydrofluoric acid

Hg = mercury

H<sub>2</sub>O<sub>2</sub> = hydrogen peroxide

IHSS = individual hazardous substance site

KOH = potassium hydroxide

Li = lithium

NaOH = sodium hydroxide

Ni = nickel

Pb = lead

PCB = polychlorinated biphenyl

Pu = plutonium

Ta = tantalum

TCA = trichloroethane

U = uranium

I, I, I, - TCA = I, I, I, - trichloroethane

EG&G ROCKY FLATS PLANT  
Integrated Operable Units

Health and Safety Addendum  
OU9-Outside Tanks

Manual: RFP/ER-TM1-93-OU9.2  
Section: Addendum (REV. 0)  
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Organization: Environmental Management

potential hazards, and hazard control measures. Concrete and asphalt removal is addressed in Section 5.4.2. Table 5-3 summarizes the hazards and controls for these activities.

#### 5.4.2 Asphalt and Concrete Removal and Sampling

(This section has no changes. The sections are repeated for the reader's convenience.)

Asphalt and concrete will be removed to collect surficial soil samples in areas covered by asphalt and concrete as well as to sample the asphalt and concrete itself. The size of the pieces to be removed may vary from a 4- to 6-inch diameter coring to a 30- by 30-inch area that may be sawed. Table 5-4 summarizes the hazards and controls for these activities.

#### 5.4.6 Tank Inspections

Tanks will be inspected to visually identify structural failures where past releases or potential releases to the environment have occurred. The inspections will be conducted in accordance with SOP FO.28, Tank and Pipeline Investigations for RFI/RIs. Tank inspections will be conducted from manhole openings, where permissible, to avoid entry into the tanks. Where necessary to open tanks, appropriate lockout/tagout will be ensured first. Table 5-9 presents the steps required to perform the work, associated potential hazards, and hazard control measures.

This task is particularly hazardous when tanks contain acutely toxic materials or require confined space entry for inspection.

#### 5.4.7 Surface Radiation Survey

Surface radiation surveys will be conducted to assess radioactive contamination of surficial materials. Radiological survey techniques for surface soils will include high purity germanium (HPGe) surveys supplemented with sodium iodide (NaI) surveys. The NaI survey will consist of performing a 4-foot-grid survey with NaI detector to delineate specific anomalies detected by the HPGe survey on the ground around the tank. Table 5-10 summarizes the steps, hazards, and controls for these activities.



EG&G ROCKY FLATS PLANT  
Integrated Operable Units

Health and Safety Addendum  
OU9-Outside Tanks

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#### 5.4.8 Residue and Wipe Samples

To help characterize Original Process Waste Line (OPWL) wastes, residue samples will be collected from each abandoned tank that has not been cleaned since its removal from process waste service. In instances where no residue is present, one wipe sample will be taken from the interior surface of the tank (preferably at the base of the tank or near pipeline connections). Where possible, residue or wipe samples will be collected remotely to mitigate the need for entry into confined spaces. Pipes will be accessed through valves or by unbolting connections. No pipe cutting is planned.

Table 5-11 summarizes the steps, hazards, and controls for these activities.

This task is particularly hazardous when tanks contain acutely toxic materials or require confined space entry for sampling.

#### 5.4.9 Vault Water/Groundwater Sampling

Sampling of incidental surface water or groundwater will be conducted to characterize potential contamination of valve vaults that are associated with OPWL tanks. Table 5-12 summarizes the steps, hazards, and controls for these activities.

#### 5.4.10 Soil Boreholes

Boreholes will be drilled and sampled to identify areas of contamination adjacent to a tank location. Areas beneath or near external connections and openings and near joints or corners around underground tanks will be targeted as primary borehole locations. As a general rule, boreholes will be drilled on each accessible side of the tank or vault, as close as possible to the tank or vault. For locations where the tanks were removed, a single borehole will be drilled as close as possible to the center of the original tank location. Soil samples will be collected from each borehole. Table 5-13 summarizes the steps, hazards, and controls for these activities.

#### 5.4.11 Groundwater Sampling

Groundwater sampling using a HydroPunch® sampler or equivalent in soil boreholes drilled into the saturated zone will be conducted to characterize potential contamination of the groundwater. Table 5-14 summarizes the steps, hazards, and controls for these activities.

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9		T-1	South side of Building 122

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
Unknown VOC's		PID	0-2,000 ppm	5-20 ppm		> 20 ppm	Monitor in BZ during Borehole & Groundwater Sampling.
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			> 1	Use tubes if PID reads > background sustained.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH #1003	Sample if PID level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro.	Saranex if contact w/liquid is anticipated
Groundwater Samples		X			nitrile	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9	122	T-2	Beneath & South of B441

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's		PID	0-2,000 ppm	5-20 ppm	>20 <sup>1</sup> ppm	>20 ppm <sup>2</sup>	<sup>1</sup> During residue sampling. <sup>2</sup> During all other activities.
Inorganic acids		Detector Tube	1-80 ppm			15 ppm	Take tube reading upon opening tank for qualitative records.
Possible metals		MIE miniram	0.1-100 mg/m <sup>3</sup>	1.5-5 mg/m <sup>3</sup>		≥5 mg/m <sup>3</sup>	Use during soil boring.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Inorganic acids	NIOSH 7903	During residue sampling, if acid tube > background and exposure time ≥ 1.5 hrs.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Surface Soil Sampling	X				silver shield				
Residue/Wipe Sampling			X		silver shield	Saranex	GMC-H		
Vault Water Sampling			X		silver shield	Saranex	GMC-H		
Borehole Samples		X			silver shield	Tyvek	GMC-H	hearing pro.	Saranex if contact w/liquid is anticipated
Groundwater Samples		X			silver shield	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9	122	T-3	South of B441

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
Ammonia	25 ppm	PID	0-2,000 ppm	12 ppm	250 ppm		
Possible metals		MIE miniram	0.1-100 mg/m <sup>3</sup>	1.5-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	Use during soil boring.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Ammonia	NIOSH 1 (205)	If PID level C action levels reached and potential exposure time ≥ 15 min.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection (Exterior)	X				nitrile		GMD-H		
Surface Soil Sampling	X				nitrile		GMD-H		
Residue/Wipe Sampling			X		nitrile		GMD-H		
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro.	Saranex If contact w/liquid is anticipated
Groundwater Samples		X			nitrile		GMC-H		Saranex If contact w/liquid is anticipated

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9	159	T-7	B528 Vault

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOCs		PID	0-2,000 ppm	5-20 ppm		> 20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			> 1 ppm	Use tubes if PID reads > background, sustained.
Chloroform	2 ppm	Detector Tube Draeger	2-10 ppm			> 2 ppm	Use tubes if PID reads > background, sustained.
Possible metals		MIE miniram	0.1-100 mg/m <sup>3</sup>	1.5-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	Use during soil boring.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH1003	Sample if level C action levels reached.
Metals	NIOSH7300	Sample if level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Borehole Samples		X			silver shields	Tyvek	GMC-H	hearing pro.	Saranex if contact w/liquid is anticipated
Groundwater Samples		X			silver shields	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated

**Site Location and Description:**

OU	IISS	TANK	LOCATION
9	126	T-8	Building 728

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC	≥ 25 ppm	PID	0-2,000 ppm	12 ppm	120 ppm <sup>1</sup>	120 ppm <sup>2</sup>	Use tubes if PID > sustained. <sup>1</sup> During inspection or residue sampling.
Chloroform Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm		> 1 ppm <sup>1</sup>	> 1 ppm <sup>2</sup>	<sup>2</sup> During other activities.
Inorganic Acids		Detector Tube	1-80 ppm			> 15 ppm	Measure acids upon opening tank.
Oxygen deficiency	< 19.5%	O <sub>2</sub> monitor			< 19.5%		Measure O <sub>2</sub> prior to and during entry.
Possible Metals		MIE Miniram	0.1-100 mg/m <sup>3</sup>	1-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	Use during soil boring.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Inorganic Acids	NIOSH 7903	Sample during residue sampling if acid to be > background and exposure time > 1.5 hrs.
Halogenated Hydrocarbons	NIOSH 1003	Sample during residue sampling/tank inspection.
Metals	NIOSH 7300	Sample if minimum Level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection				X	Nitrile	Tychem 9400	GMC-H	Hearing	Confined Space Entry
Residue/Wipe Sampling				X	Nitrile	Tychem 9400	GMC-H	Hearing	Confined Space Entry
Borehole Samples		X			Nitrile	Tyvek	GMC-H	Hearing	Saranex if contact with
Groundwater Samples		X			Nitrile	Tyvek	GMC-H		liquid is anticipated.

**Site Location and Description:**

OU	IISS	TANK	LOCATION
9	132	T-9	Building 730

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOCs (TCA, TCE, Toluene)	≥ 50 ppm	PID	0-2,000 ppm	25 ppm		250	Use tubes if PID > background sustained.
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm		> 1 ppm <sup>1</sup>	< 1 ppm <sup>2</sup>	<sup>1</sup> During inspection or residue sampling. <sup>2</sup> During all other activities.
Oxygen Deficiency	< 19.5%	O <sub>2</sub> monitor	0-100%		< 19.5%	≥ 5 mg/m <sup>3</sup>	Use during confined space entry.
Possible Metals	Varies	MIE miniram	0.1-100 mg/m <sup>3</sup>	1-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	Use during soil boring.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	During confined space entry for inspection or residue sampling.
Metals	NIOSH 7300	Sample if minimum Level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection (Interior)				X	Nitrile	TYCHEM 9400	GMC-H	Harness & line	Confined space entry.
Residue/Wipe Sampling				X	Nitrile	TYCHEM 9400	GMC-H	Harness & line	Confined space entry.
Borehole Samples		X			Nitrile	Tyvek	GMC-H	Hearing pro.	Saranex if contact
Groundwater Samples		X			Nitrile	Tyvek	GMC-H		with liquid is likely.

### Site Location and Description:

OU	IHSS	TANK	LOCATION
9	132	T-10	8730

### Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOCs	> 50 ppm	PID	0-2,000 ppm	25		250	
(TCA, TCE, Toluene)							
Carbon Tetrachloride	2 ppm	Detector Tube Sensidyne	1-60 ppm		> 1 ppm <sup>1</sup>	> 1 ppm <sup>2</sup>	Use tubes if PID > background sustained. <sup>1</sup> During inspection or residue sampling. <sup>2</sup> During all other activities.
Oxygen Deficiency	< 19.5%	O <sub>2</sub> monitor	0-100%		< 19.5%		Use during confined space entry.
Possible metals		MIE miniram	0.1-100 mg/m <sup>3</sup>	1-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	Use during soil boring.

### Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	During confined space entry for inspection or residue sampling.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

### Personal Protective Equipment:

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection (Interior)				X	nitrile	TYCHEM 9400	GMC-H	harness & line	Confined space entry.
Residue/Wipe Sampling				X	nitrile	TYCHEM 9400	GMC-H	harness & line	Confined space entry.
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro.	Saranex if contact w/liquid is anticipated
Groundwater Samples		X			nitrile	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated



**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9		T-11, T-30	8731, East of B707

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's	> 50 ppm	PID	0-2,000 ppm	5-20 ppm		> 20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			> 1 ppm	Use tubes if PID reads > background sustained.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	Sample if level C action levels reached.

**Personal Protective Equipment:**

Personal Protective Equipment									
	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Groundwater Samples		X			nitrile	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated.
Soil Sampling	X				nitrile	Tyvek	GMC-H		
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing protection	Saranex if contact w/liquid is anticipated
Surface Radiation Survey	X				nitrile	Tyvek	GMC-H		
Residue/Wipe Sampling		X			nitrile	Saranex	GMC-H		Saranex required if clothing contamination likely, otherwise Level D.

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9	124	T-14, T-16	East of B774

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's		PID	0-2,000 ppm	5-20 ppm		> 20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			> 1 ppm	Use tubes if PID reads > background sustained.
Possible Metals		MIE miniram	0.1-100 mg/m <sup>3</sup>	1-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	Use during soil borings.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	Sample if applicable level C or B action levels reached.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X				nitrile	Tyvek	GMC-H		
Tank/Pipeline Inspection (Interior)	X				nitrile	Tyvek	GMC-H		
Residue/Wipe Sampling	X				nitrile	Tyvek	GMC-H		
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro.	Saranex if contact w/liquid is anticipated
Groundwater Samples		X			nitrile	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9	164.2	T-21, T-22	8828 vault, West of B886

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's		PID	0-2,000 ppm	5-20 ppm			
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			> 1 ppm	Use tubes if PID reads > background sustained.
Oxygen deficiency	19.5%	O <sub>2</sub> monitor	1-100%		≤19.5%		Comply w/ RWP.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	If level C, action levels are reached (on PID or detector tube).

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection									
Residue/Wipe Sampling									
Vault Water Sampling									
Borehole Samples								Hearing pro.	
Groundwater Samples									

Knee-high boots for possible rattlesnakes, entering vault use illumination & probe.

**Site Location and Description:**

OU	IISS	TANK	LOCATION
9		24 & 32	Building 887

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's	≥ 50 ppm	PID	0-2,000 ppm	25 ppm		250	Use tubes if PID > background sustained.
(TCA, TCE)							
Carbon Tetrachloride	2 ppm	Detector tube	1-60 ppm			> 1 ppm	
Possible Metals		MIE Miniram	0.1-100 mg/m <sup>3</sup>	1-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	During soil boring.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Metals	NIOSH 7300	Sample if minimum Level C action levels.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Soil Sampling	X				Nitrile	Tyvek	GMC-H		
Borehole Samples		X			Nitrile	Tyvek	GMC-H	Hearing pro.	Saranex if contact
Groundwater Samples		X			Nitrile	Tyvek	GMC-H		with liquid is likely.

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9		T-27	North of B828

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's		PID	0-2,000 ppm	5-20 ppm		> 20 ppm	
Carbon Tetrachloride	2 ppm	Detector tubes	1-60 ppm			> 1 ppm	Use tubes if PID reads > background sustained.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NOSH 1003	If level C, action levels are exceeded.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Surface Soil	X				Nitrile	Saranex	GMC-H		

**Site Location and Description:**

OU	IHSS	TANK	LOCATION
9		T-29	South of B774, East of B703

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's		PID	0-2,000 ppm		> 5 ppm <sup>1</sup>	> 5 ppm <sup>2</sup>	<sup>1</sup> During Interior Inspection or residue sampling.
Carbon Tetrachloride	2 ppm	Detector Tubes	1-60 ppm		> 1 ppm <sup>1</sup>	> 1 ppm <sup>2</sup>	<sup>2</sup> During all other activities.
Chloroform	2 ppm	Detector Tubes	2-10 ppm		> 1 ppm <sup>1</sup>	> 1 ppm <sup>2</sup>	Use tubes if PID > background sustained.
Hydrogen Cyanide	4.7 ppm(ST)	Detector Tubes			> 2 ppm		Measure HCN and acids upon opening tank.
Inorganic Acids		Dectector Tubes	1-80 ppm			> 15	
Oxygen Deficiency	< 19.5%	O2 detector			≤ 19.5%		
Possible Metals		MIE miniram	0.1-100 mg/m <sup>3</sup>	1.5-5 mg/m <sup>3</sup>		≥ 6 mg/m <sup>3</sup>	Use during soil boring.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Inorganic acids	NIOSH 7903	Sample during residue sampling if acid tube > background and exposure time > 1.5 hrs.
Halogenated Hydrocarbons	NIOSH 1003	Sample during residue sampling if PID Level B action level reached and exposure time > 1.5 hrs.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X				nitrile				
Tank/Pipeline Inspection (Interior)				X	silver shield	TYCHEM 9400	GMC-H	fall pro.	possible work at heights
Surface Soil Sampling	X				silver shield		GMC-H		
Residue/Wipe Sampling				X	silver shield	TYCHEM 9400	GMC-H		
Vault Water Sampling		X			silver shield	Tyvek	GMC-H		TYCHEM 9400 if entry required
Borehole/Groundwater Samples		X			silver shield	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated

**Site Location and Description:**

OU	IISS	TANK	LOCATION
9		T-40	West to U889

**Suspect Contaminants:**

MONITORING REQUIREMENTS				ACTION LEVELS			Notes
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	
VOC's		PID	0-2,000 ppm	5-20 ppm	> 20 ppm <sup>1</sup>	> 20 ppm <sup>2</sup>	<sup>1</sup> During interior inspection and residue sampling.
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm		> 1 ppm <sup>1</sup>	> 1 ppm	<sup>2</sup> During all other activities.
Sulfuric Acid	1 mg/m <sup>3</sup>	Detector Tube	1-5 mg/m <sup>3</sup>			5 mg/m <sup>3</sup>	Measure sulfuric acid upon opening tank.
Oxygen Deficiency	<19.5%	O2 monitor			<19.5%		Measure O <sub>2</sub> prior to and during entry.
Possible metals		MIE miniram	0.1-100 mg/m <sup>3</sup>	1.5-5 mg/m <sup>3</sup>		≥ 5 mg/m <sup>3</sup>	Use during soil borings.

**Personal Monitoring:**

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	Sample during residue sampling.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

**Personal Protective Equipment:**

Type of Work	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection (Interior)			X		nitrile	TYCHEM 9400	GMC-H	harness & line	confined space entry.
Residue/Wipe Sampling			X		nitrile	TYCHEM 9400	GMC-H	harness & line	confined space entry.
Vault Water Sampling	X								TYCHEM 9400 required if clothing contamination likely, otherwise Level D.
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro.	Saranex if contact w/liquid is anticipated
Groundwater Samples		X			nitrile	Tyvek	GMC-H		Saranex if contact w/liquid is anticipated